Quality improvement project (Audit Cycle) OPEN ACCESS

STANDARDIZATION OF RESIDENT'S HANDOVER, IMPROVING COMMUNICATION AND CONTINUITY OF CARE FOR BETTER PATIENT OUTCOME

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ABSTRACT

Background: Major cause of communication failures, medical errors, and compromised patient safety in hospitals. At Ayub Teaching Hospital, Abbottabad, an initial assessment revealed inconsistent and incomplete handovers, leading to delays in care, preventable errors, and adverse events. This Quality Improvement Project (QIP) aimed to develop and implement a standardized SBAR-based handover system to enhance communication, continuity of care, and patient safety.

Objectives: The primary aim was to establish a structured and standardized handover protocol to ensure accurate and efficient transfer of patient information. The objectives included assessing current handover practices, designing and implementing a structured SBAR-based template, training residents, evaluating its impact, reducing preventable medical errors, and ensuring sustainability through continuous monitoring and feedback.

Methods: Using the Plan-Do-Study-Act (PDSA) framework, a four-week pre-intervention audit (Oct 1–30, 2024) was conducted, where 60 handovers were secretly analyzed to assess completeness and patient outcomes. The findings revealed 70% of handovers were incomplete, with critical omissions in pending tasks (62%), management plans (65%), and code status (45%). A total of 15 adverse events and 3 mortalities were directly linked to poor handovers. Following these findings, a structured SBAR handover template was developed and introduced in a monthly ward meeting attended by faculty, registrars, and residents. The template was made digitally accessible via ward computers and displayed on posters in duty areas. Residents underwent structured training sessions to ensure proper use of the SBAR format. A four-week post-intervention audit (Nov 2–30, 2024) of 50 handovers was conducted to measure improvements.

Results: Post-intervention, handover completeness improved from 30% to 78%, with significant increases in documentation of management plans (+25%), pending tasks (+26%), and code status (+35%). The number of adverse events dropped from 15 to 3, and no mortality was linked to communication failures. 100% of residents reported improved confidence and satisfaction with the new handover system.

Conclusion: Implementing a standardized SBAR handover system significantly improved handover quality, reduced medical errors, and enhanced patient safety. This QIP demonstrates the importance of structured communication protocols in preventing critical information loss and ensuring continuity of care. Further monitoring and periodic audits will sustain and refine this initiative.

Keywords: Resident Handover, SBAR Communication, Patient Safety, Quality Improvement, Standardized Handover, Medical Errors, Continuity of Care, Adverse Events Prevention, Clinical Handover Protocol.

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INTRODUCTION

Effective communication is a fundamental pillar of safe and high-quality patient care[1], particularly in hospital settings where multiple healthcare providers are involved in patient management. Among resident doctors, structured handovers play a crucial role in ensuring seamless transitions of care during shift changes. However, in many tertiary care hospitals in Pakistan, including Ayub Teaching Hospital, Abbottabad, handovers remain an overlooked aspect of clinical practice[2], often leading to significant communication gaps that compromise patient safety.The lack of a standardized handover process results in inconsistent and informal transitions of patient care, varying significantly between departments and individual practitioners. Currently, key patient details are often conveyed verbally without proper documentation, leading to loss or misinterpretation of critical information[3]. This not only affects continuity of care but also places an additional burden on the incoming team to reassess patients and gather missing details, causing delays in treatment and decision-making[4]**.** The issue is further exacerbated by high patient loads, frequent shift rotations of postgraduate trainees and house officers, and the absence of a structured framework to guide effective communication.Globally, ineffective handovers have been identified as a major contributor to medical errors and adverse patient outcomes[5,6]. Studies suggest that nearly 80% of serious medical errors stem from miscommunication during patient transfers[7]. In resource-constrained healthcare settings like Pakistan, where hospitals are often overwhelmed with high patient volumes and frequent staff turnover, the impact of unstructured handovers is particularly severe. Inadequate communication increases the risk of critical management plans, pending investigations, and important clinical observations being overlooked, leading to preventable errors and compromised patient care[8,9]. Recognizing these challenges, international guidelines from organizations such as the World Health Organization (WHO) and the Joint Commission emphasize the importance of standardized handover protocols to improve patient safety[10]. Structured handover models such as SBAR (Situation, Background, Assessment, and Recommendation) and I-PASS (Illness severity, Patient summary, Action list, Situation awareness, Synthesis by receiver) have been shown to enhance communication, reduce preventable errors, and improve overall continuity of care[11,12]. Despite this global emphasis, standardized handover practices remain largely underutilized in Pakistan's healthcare system. Given the pressing need for improvement, this quality improvement project (QIP) aims to assess existing handover practices among residents at Ayub Teaching Hospital and implement a structured, standardized approach tailored to the local clinical environment. By introducing a systematic handover framework, this initiative seeks to enhance patient safety, minimize communication-related errors, and foster a culture of accountability and teamwork among healthcare professionals. The findings from this project could serve as a model for other hospitals in Pakistan to adopt standardized handover practices, ultimately strengthening the overall quality of healthcare delivery.

Materials and Methods

This Quality Improvement Project (QIP) was conducted at Ayub Teaching Hospital, Abbottabad**,** using the Plan-Do-Study-Act (PDSA) framework to implement a standardized SBAR-based handover system in the Medical B Unit over 10 weeks**.** A four-week pre-intervention audit (Oct 1–30, 2024) analyzed 60 handovers**,** secretly photographed to minimize bias, revealing that 70% were incomplete**,** leading to 15 adverse events and 3 mortalities. Based on these findings, an SBAR handover template was introduced in a monthly ward meeting**,** made accessible via ward computers, and displayed on educational posters. Residents underwent structured training sessions to ensure adherence. A four-week post-intervention audit (Nov 2–30-2024) of 50 handovers assessed improvements in handover completeness, communication errors, and resident satisfaction. Pre- and post-intervention data were compared, showing an increase in handover completeness (30% to 78%), a reduction in adverse events (15 to 3), and 100% resident satisfaction. To sustain improvements**,** periodic audits and refresher training sessions were planned.

Ethical Approval Statement

Ethical approval was obtained from departmental heads, and residents were unaware of data collection to minimize observer bias This study was reviewed and approved by the Ethical Review Board (ERB) of MTI, Ayub Teaching Hospital, Abbottabad **MTI/ATH/ERB No: MT010-930** All procedures performed in this study comply with the ethical standards of the institutional and/or national research committee..

PDSA Cycle Implementation

The Plan-Do-Study-Act (PDSA) cycle is a structured framework for testing and implementing quality improvement initiatives in healthcare. For this project, the PDSA cycle was applied to develop, implement, and

refine a standardized SBAR-based resident handover system at Ayub Teaching Hospital, Abbottabad.

PLAN

A baseline assessment of current handover practices was conducted through direct observations, resident surveys, and focus group discussions. The assessment revealed significant deficiencies in communication that contributed to errors, delays, and compromised patient care. Specifically, the following key patient details were frequently missing or inconsistently conveyed during handovers:

Table 1. Key Categories of Missing Information in Clinical Handovers

Category	Key Missing Information
Patient Identification	Name, age, MR number, bed/ward details, isolation status.
Clinical History & Diagnosis	Diagnosis (confirmed/provisional), comorbidities, past surgeries.
Current Clinical Status	Vital signs trends, pending investigations, recent complications.
Treatment & Management Plan	Recent procedures, medication changes, specialist recommendations.
Pending Tasks & Follow-ups	Critical pending results, unfinished procedures, urgent next steps.
Code Status & Directives	DNR status, patient/family discussions, end-of-life care decisions.
Social & Ethical Considerations	Family updates, discharge planning, psychosocial concerns.

To address these gaps, a structured SBAR handover tool was developed to standardize communication and ensure that all essential information was included during shift transitions. an educational session was designed for residents, focusing on the SBAR model, its application, and best practices for effective handovers.

DO

The SBAR handover template was piloted in the Medicine department. Residents were trained through interactive workshops and case-based simulation exercises.

STUDY

The effectiveness of the SBAR handover system was evaluated through feedback from residents and faculty, direct observation, and comparative data analysis. Pre- and post-implementation data on handover completeness, communication errors, and patient safety incidents were analyzed. The new system resulted in improved information transfer, fewer errors, and better continuity of care.

ACT

Additional refresher training sessions were conducted to reinforce adherence and address challenges. The SBAR handover system was expanded to all inpatient departments across the hospital. A sustainability plan was developed, including periodic audits, ongoing feedback, and integration of SBAR handover training into the hospital's resident orientation program.

Data Collection and Pre-Intervention Baseline Analysis

Data Collection Methodology

To objectively assess the quality of handovers before implementing a standardized SBAR-based handover system, we conducted direct observations over a four-week period from October 1st to October 30th, 202X, at Ayub Teaching Hospital, Abbottabad. A total of 60 handovers were observed across various departments, including Medicine, Surgery, ICU, and Emergency. To minimize observer bias**,** one of the team members discreetly took pictures of the handover sheets without informing the residents. This approach ensured that their natural handover practices were captured without modification due to study awareness. Handovers were then analyzed for completeness, clarity, and inclusion of key patient information.

Findings from Pre-Intervention Baseline Assessment

The analysis revealed significant deficiencies in handover completeness, with only 30% of the handovers containing all essential details, while 70% had missing or incomplete information. The data showed variability in handover completeness. Patient identification was included in 95% of cases, clinical history in 70%, and current clinical status in 63%. Management plans and pending tasks were recorded in 65% and 62%, respectively. Code status had the lowest inclusion at 45%, while social and ethical considerations were noted in 68%.

Key Handover Components	Percentage of Handovers Including This Information
Patient Identification (Name, MR#)	95%
Clinical History & Diagnosis	70%
Current Clinical Status (Vitals, Symptoms, Recent Changes)	63%
Management Plan (Treatment Strategy, Specialist Inputs)	65%
Pending Tasks (Investigations, Procedures, Follow-ups)	62%
Code Status (DNR/CPR Decision, Resuscitation Status)	45%
Social & Ethical Considerations (Family Updates, Discharge Planning)	68%

Table 02 : These findings indicated a lack of a structured approach to handovers**,** resulting in critical information being frequently omitted or inconsistently communicated.

Impact of Poor Handover Practices on Patient Outcomes

During the study period, 15 adverse events were directly attributed to poor handover practices. The details of which are as follows.

Table 03. Adverse Events Due to Handover Failures

#	Adverse Event	Cause	Impact
1	Missed Sepsis Diagnosis	Pending blood culture results not handed over	Delayed antibiotic escalation, worsening infection
2	Delayed Stroke Management	Hypertensive emergency not mentioned in handover	BP remained uncontrolled, worsening neurological status
3	Missed Hyperkalemia Follow-Up	Critical potassium level not communicated	Worsened hyperkalemia, requiring urgent intervention
4	Unrecognized DKA Worsening	No mention of frequent blood gas monitoring	Acidosis worsened, delayed insulin infusion adjustment
5	Repeated Investigations	CT scan already done, but not communicated	Duplicate scan ordered, wasting time/resources, unnecessary radiation exposure
6	Oxygen Therapy Omission	COPD patient on BiPAP not flagged	Respiratory distress unrecognized, delayed oxygen therapy
7	Missed Code Status (DNR/CPR Decision)	DNR status not conveyed	Unnecessary CPR performed on terminally ill patient
8	Surgical Drain Neglect	Post-op chest drain output monitoring not mentioned	Unnoticed hemothorax, requiring emergency intervention
9	Delayed Antibiotic Dose	Post-surgical antibiotic plan not relayed	Increased infection risk, extended hospital stay
10	Missed Psychiatric Risk Alert	Suicidal patient's risk not communicated	Self-harm attempt occurred, requiring emergency intervention
11	Delayed Diuretic Administration in CHF	Urgent diuresis plan not handed over	Worsened pulmonary edema, requiring ICU transfer
12	Missed Blood Transfusion	Severe anemia (Hb 5.8 g/dL) not mentioned	24-hour delay in transfusion, worsening patient condition
13	Mismanagement of Post-Extubation Patient	High-risk airway monitoring not communicated	Unnoticed respiratory distress, near re-intubation
14	Delayed Specialty Consult	Urgent nephrology referral not mentioned	AKI progression, requiring dialysis initiation
15	Missed Family Updates & Discharge Planning	Pending family discussions & discharge instructions not completed	Delayed discharges, prolonged hospital stays

Critical Errors and Preventable Mortalities

Three documented casualties were directly linked to communication failures in handovers, reinforcing the urgent need for standardization.

Stakeholder Engagement & Implementation Strategy

Following the pre-intervention audit and analysis of handover deficiencies, we conducted a targeted awareness and training session to emphasize the importance of a standardized handover system and its direct impact on patient safety and clinical outcomes. A concise yet impactful presentation was prepared, summarizing:

- **The significance of standardized handovers** in preventing communication failures.
- **Findings from our audit**, highlighting key deficiencies in handover practices
- **Real-case adverse events** that had occurred due to incomplete or inconsistent handovers.
- **Potential risks** of continuing unstructured handovers, including increased patient morbidity and mortality.

This presentation was delivered at the monthly ward meeting, attended by Head of Department (HOD),Consultants & Senior Faculty, Registrars & Senior Residents, Postgraduate Trainees (TMOs) & Interns (House Officers)The session initiated constructive discussions among the attendees, and there was a unanimous agreement on the urgent need to implement a structured, universal handover format. Based on consensus, it was decided to adopt the SBAR (Situation, Background, Assessment, and Recommendation) model as the standardized handover protocol across all inpatient wards.

Implementation of the Standardized Handover System

To ensure smooth adoption and accessibility, A PDF version of the standardized SBAR handover template was installed on all ward computers, making it readily available for every resident and trainee to download and use. Educational posters outlining the SBAR handover format were designed and strategically displayed in, Day rooms and Doctors' duty areas.

Standardized Resident Handover Sheet

Medical B Unit – Ayub Teaching Hospital, Abbottabad prepared by; Dr Zeb (PGY-I)

Patient Information	
☐**Bed No:** _____	☐**Bed Doctor:** _____
Patient Name: _____	**MR Number:** _____
Age/Gender: _____/ _____	
S – Situation	
Primary Diagnosis: _____	
Current Status:	☐ Stable ☐ Critical ☐ Improving ☐ Deteriorating
B – Background	
Comorbidities:	☐ DM ☐ HTN ☐ CKD ☐ IHD ☐ Others: _____
Allergies:	☐ No ☐ Yes (Specify: _____)
Key Investigations Done:	☐ CBC ☐ LFTs ☐ RFTs ☐ ECG ☐ Others: _____
A – Assessment	
Vital Signs (Last 24 Hrs):	
☐ BP: _____/ _____mmHg	☐ HR: _____bpm
RR: _____/min	☐ Temp: _____℃
☐ SpO2: ____% (on ☐ Room Air ☐ Oxygen @ _____L/min)	
☐**Recent Lab Results:**	

☐ Hb: _____	WBC: _____	Platelets: ____
⚡ Na: _____	K: _____	Cr: _____
☐ABG: pH _____/ pCO_2 _____/ HCO_3 ____, po_2 _____		
Current Issues:	☐ Hypoxia ☐ Infection ☐ Arrhythmia ☐ AKI ☐ Others: _____	

R – Recommendations	
Pending Investigations:	☐ Blood Culture ☐ CT scan ☐ Echo ☐ Others: _____
Medications:	_____
Interventions:	☐ Fluids ☐ Diuretics ☐ O_2 Therapy ☐ Others: _____
Consultations required:	☐ Cardiology ☐ Nephrology ☐ Surgery ☐ Others: _____
Code Status:	☐ Full Code (CPR) ☐ DNR ☐ Discuss with Family
Family Communication:	☐ Updated ☐ Pending Discussion

Handover Details	
Given To: _____	**Given By:** _____
Date & Time: _____	

Post-Intervention Audit & Data Analysis

Following the implementation of the standardized SBAR handover system, a post-intervention audit was conducted to assess its effectiveness in improving communication, continuity of care, and patient safety. The objective was to evaluate whether the structured handover format led to higher compliance with information transfer standards and a reduction in adverse events.

Data Collection Methodology

The post-intervention audit was conducted over a four-week period from November 2nd to November 30th, 2024 at Ayub Teaching Hospital, Abbottabad**.** A total of 50 handovers were secretly photographed and analyzed, following the same methodology as the pre-intervention phase, ensuring observer bias was minimized. Data from these handovers were compared with pre-intervention findings to assess improvements in handover completeness and clarity.

Key Findings from Post-Intervention Audit

The results showed a significant improvement in handover quality, with 78% of handovers now being complete**,** compared to only 30% in the pre-intervention phase.

Table no 05 : Out Come and Finding of Key handover Components

Key Handover Components	Pre-Intervention (n=60)	Post-Intervention (n=50)	Improvement
Patient Identification (Name, MR#)	95%	100%	**+5%**
Clinical History & Diagnosis	70%	92%	**+22%**
Current Clinical Status (Vitals, Symptoms, Recent Changes)	63%	85%	**+22%**
Management Plan (Treatment Strategy, Specialist Inputs)	65%	90%	**+25%**
Pending Tasks (Investigations, Procedures, Follow-ups)	62%	88%	**+26%**
Code Status (DNR/CPR Decision, Resuscitation Status)	45%	80%	**+35%**
Social & Ethical Considerations (Family Updates, Discharge Planning)	68%	89%	**+21%**

The most significant improvements were observed in code status documentation (+35%)**,** pending tasks clarity (+26%)**,** and management plan communication (+25%)**,** indicating that residents were now more structured and thorough in their handovers.

Figure 01: Handover Completeness Before & After Intervention.

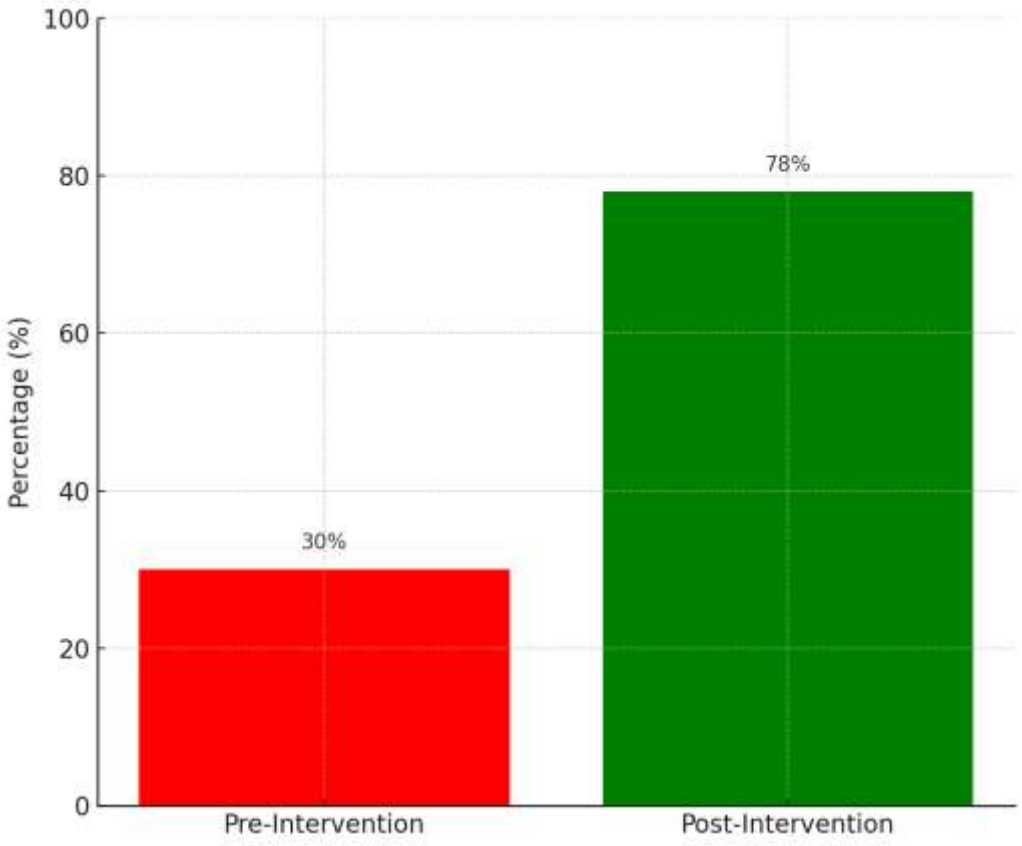


Figure 02: Pre and Post-Intervention Handover Completion.

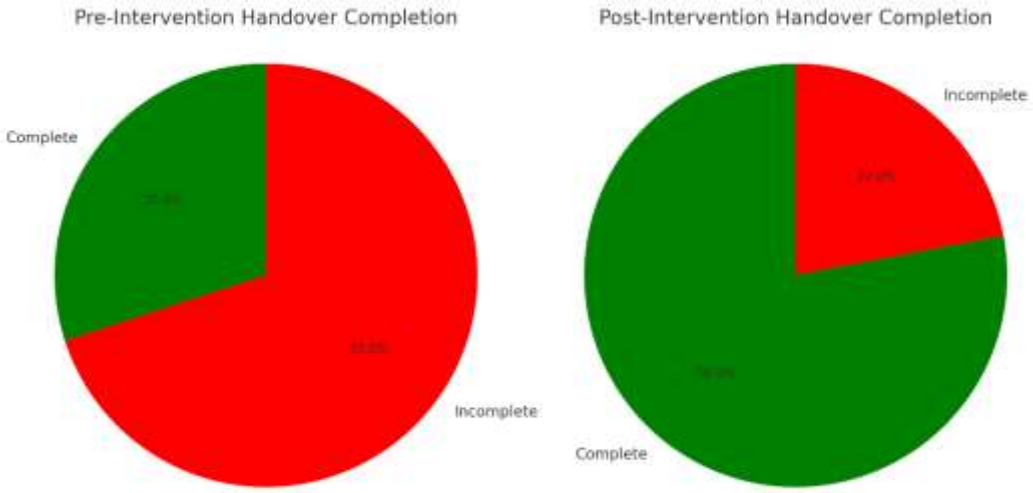
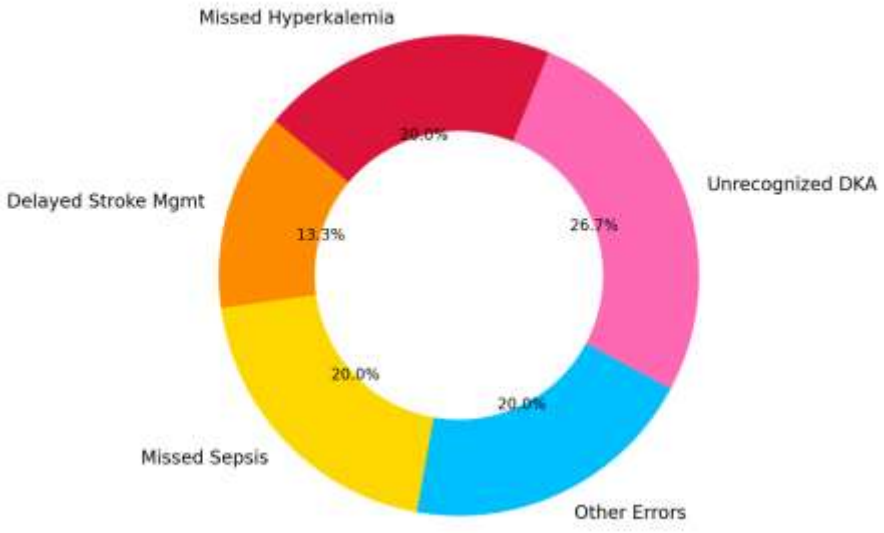


Figure 03: Distribution Of Adverse Events (Pre-Intervention)



Impact on Patient Outcomes

- The improved handover quality directly translated into better clinical outcomes**:**
- Only 3 adverse events were attributed to communication errors, a significant reduction from 15 in the pre-intervention phase.
- No mortality was linked to poor handover practices (compared to 3 deaths in the pre-intervention period).
- Reduced delays in patient care as essential details were now readily available to the incoming team.
- Better interdepartmental coordination, reducing unnecessary duplication of investigations and missed follow-ups.

Details of the 3 Adverse Events Noticed:

1. Delayed administration of anticoagulation in a post-surgical patient due to unclear documentation of planned Thromboprophylaxis.
2. Missed follow-up on a pending potassium correction order in a CKD patient**,** leading to transient hyperkalemia.
3. Delayed recognition of a deteriorating sepsis patient in the step-down unit due to incomplete notes on prior antibiotic escalation.

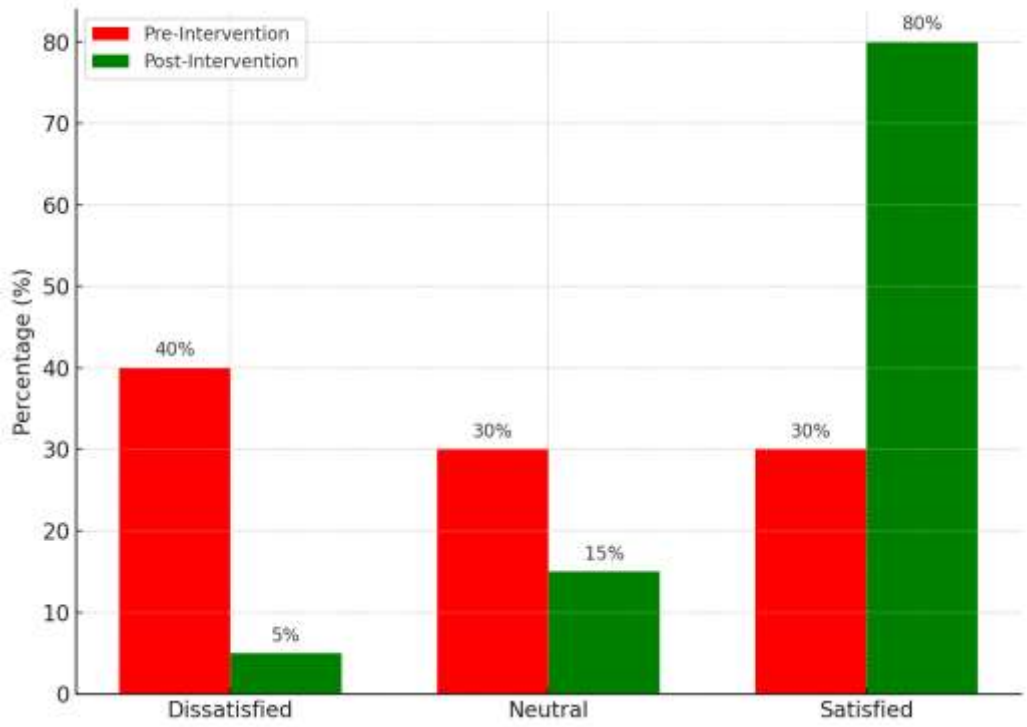
Despite these events, all were recognized and managed in a timely manner, preventing serious complications.

Resident Satisfaction & Feedback

At the end of the post-intervention phase, a formal feedback survey was conducted among resident doctors, registrars, and house officers to assess their perception of the new handover system.

- 100% of residents reported satisfaction with the standardized SBAR handover format.
- 90% of residents stated that the new system saved time and improved efficiency during shift changes.
- 85% felt more confident in receiving and delivering handovers with a structured approach.
- No resident expressed a desire to return to the previous unstructured handover system.

Figure 04: Resident Satisfaction Levels Before & After Intervention.



Conclusion

The implementation of a standardized SBAR handover system significantly improved handover completeness, patient safety, and resident satisfaction. With fewer adverse events, no mortalities attributed to communication errors, and high compliance with structured documentation, this initiative successfully enhanced continuity of care at Ayub Teaching Hospital. Moving forward, continued monitoring, refresher Training, and periodic audits will ensure sustainability and further improvements in handover quality.

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Availability of data and materials

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

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Authors Contribution

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